NATIONAL OCEAN SERVICE
NATIONAL CENTERS FOR COASTAL OCEAN SCIENCE
STRATEGIC PLAN
1999 - 2004

NOAA's broad coastal stewardship mandates range from conserving and managing marine and estuarine protected areas of unique national significance, to ensuring the quality of the Nation's coastal ocean, estuarine, and Great Lakes waters and ecosystems, to providing technical support to maritime and other users of the U.S. Exclusive Economic Zone. NOS is in a unique position to provide much needed leadership for coastal stewardship as the federal focal point for coastal and oceanic activities. The role of the National Centers for Coastal Ocean Science (NCCOS) will be to lead NOS, NOAA, and the Nation in the coastal sciences by implementing and maintaining a strong, integrated, science program focused on improving our understanding and ability to predict the cumulative effects of human activities on coastal ecosystems.

The NCCOS Vision

We envision an NCCOS that provides the foundation for coastal ocean, estuarine, and Great Lakes science and offers the best available research, products, and services to improve stewardship of the Nation's coastal and Great Lake environments.

To accomplish this NCCOS will:

- conduct rigorous and interdisciplinary research, monitoring, and assessment,
- foster new scientific understanding and technologies,
- encourage innovative and independent science to identify emerging coastal issues,
- improve the application of sound science for innovative coastal management and operations,
- ensure that our science, products, and services are integrated into the coastal community to improve stewardship of the Nation's coastal and Great Lakes environments.

This scientific program will increase the relevance and credibility of NOS's coastal stewardship mission, promote the needs of our user community, and increase the utility and accessibility of coastal science to decision-makers.

The NCCOS Mission

To provide a sound scientific basis for NOAA's coastal programs, products, and services by developing and maintaining a broad cadre of scientific experts and science capabilities through both intramural and extramural research, monitoring, and assessment programs.

Effective and responsible coastal stewardship of our nation's coastal, Great Lakes, and ocean resources, ecosystems, and economies requires the following:

- reliable and accurate scientific information,
- a solid understanding of coastal ecosystems, human use issues, and interactions among natural systems and humans,
- the capacity to use that information in sound, science-based operational and management policies and techniques to ensure long-term sustainability of our nation's coastal, Great Lakes, and ocean resources, ecosystems, and economies.

Coastal ecosystems include the physical, biological, chemical, geological, social, economic, and cultural components of the Nation's bays and estuaries, the Great Lakes, and the coastal ocean to the outer edge of the U.S. Exclusive Economic Zone. The scope of NCCOS's mission addresses important and complex linkages with upland watersheds, airsheds, coastal bays, estuaries, and the open ocean in cooperation with international coastal science programs.

NCCOS will capitalize on a strong regional presence and partnerships with external scientific expertise to provide reliable and sound scientific data, information, products, and technical assistance to NOAA and to its other Federal, state, academic, non-governmental, and public partners.

Science Goals and Objectives

NCCOS will set science priorities to meet a variety of users' needs. As an important generator of scientific information within NOAA, NCCOS will work with other line offices to provide the management and operational communities with the scientific basis for decision-making, including an improved understanding of how coastal systems work, advanced forecast and predictive capabilities, and integration of data for National, regional, and local assessments.

NCCOS will undertake the following principal scientific goals and objectives to improve the environmental well-being and sustainability of the Nation's coastal, estuarine and Great Lakes resources:

GOAL: *Predict and Assess the Impacts of Multiple Stressors on Coastal Ecosystems*

Our Nation's ecosystems are suffering from natural and human-induced stressors, including harmful algal blooms (HABs), toxic contaminants, coastal eutrophication, nonindigenous species, land cover and land use change, and habitat degradation. These stressors often act synergistically and antagonistically, and as a result their cumulative impacts on ecosystem structure and function are poorly understood and difficult to assess and manage. With the emerging technologies of the 21st century, we are poised to make a quantum advance in finding a common currency or a suite of techniques to address the impacts of multiple stresses.

This goal supports NOS's goals to enhance the preservation and restoration of the U.S. coastal, ocean and Great Lakes environments; reduce the costs and risks to people, the economy, and natural resources from natural and human-induced hazards; and increase coastal communities' ability to adapt to changing conditions, resulting in a balance of environmental and economic benefits.

Objectives:

The rapid decline in ecosystem health has caused genuine and widespread concern about our ability to maintain the current standard of living along the coasts. To address these concerns NCCOS will:

- Develop indicators of the health of coastal ecosystems.
- Provide the means to detect, monitor, and predict the effects of multiple anthropogenic and natural perturbations on coastal ecosystems.
- Develop technologies, ranging from biotechnology to remote sensing, to produce accurate, rapid, and sensitive methods to collect and integrate coastal environmental data.
- Assess and predict the effects of land cover, land use practices, point and nonpoint source pollution, and hydrological and physical dynamics on riverine, estuarine, and coastal ecosystems.
- Provide information and input to management strategies to mitigate the impacts of multiple stressors.
- Evaluate the time and space scales at which important processes occur.

GOAL: *Conserve and Restore Coastal Habitat and Biodiversity*

The decline of species, changes in biodiversity, and degradation of habitats are just a few indications that both natural forces (extreme events, climate change, etc.) and human activities (coastal development, pollution, the introduction of invasive species, etc.) pose serious threats to our coastal and marine ecosystems. While some changes are reversible over time if the offending conditions are ameliorated, the likelihood of recovery for many habitats is uncertain and active restoration or

rehabilitation may be required. Restoration of these habitats to conditions that support more natural systems, after environmental damage has been done, requires a more complete understanding of their structure and function and time and space scales of interacting processes.

This goal supports NOS's goals to enhance the preservation and restoration of the U.S. coastal, ocean and Great Lakes environments and reduce the costs and risks to people, the economy, and natural resources from natural and human-induced hazards.

Objectives:

To improve our understanding of the impacts of natural and human influences on habitat and biodiversity and develop enhanced restoration methodologies for rebuilding damaged habitats NCCOS will:

- Improve our understanding of how physical processes affect coastal and Great Lakes habitats and biodiversity.

- Characterize habitat requirements at the species and community levels and define natural and anthropogenic factors leading to habitat loss or degradation.

- Improve capabilities to restore coastal habitat by developing and validating restoration strategies that consider the ecological costs/benefits of habitat disturbance/restoration.

- Develop methods to quantify and document changes in habitat quantity and quality and in biodiversity.

- Define linkages among habitat types and improve ecological and oceanographic predictions that support conservation and management of coastal and marine ecosystems.

- Improve our understanding of the causes and impacts of species invasions and changes in biodiversity.

- Develop an understanding and predictive capability of harmful algal bloom occurrence, persistence, and effects and develop means to prevent and control blooms, and mitigate their impacts.

- Assess the impacts of invasive species, improve our understanding of the risks and potential consequences of new invaders, and advance the means to prevent their introduction and spread.

- Assess the impacts of fisheries operations on coastal ecosystem health and species richness.

GOAL: *Predict Coastal Impacts of Weather, Climate Variability and Change, and Extreme Events*

Global climate change complicates our efforts to understand short term human-related impacts on coastal resources. The effects of decadal scale variations in warming and cooling cycles, for example, can have significant impacts on the distribution and abundance of living marine resources and the food webs that supports them. Sea level rises cause significant shoreline inundation, overstepping of barrier islands, loss of intertidal wetlands, and increased salinization of coastal embayments. Changes in precipitation patterns can influence inflow of essential fresh water to estuarine and Great Lakes systems, while changes in the frequency and intensity of storms may affect protection of life and property, as well as ecosystem processes.

This goal supports NOS's goals to enhance the preservation and restoration of the U.S. coastal, ocean and Great Lakes environments; reduce the costs and risks to people, the economy, and natural resources from natural and human-induced hazards; expand and improve navigation services and products; and increase coastal communities' ability to adapt to changing conditions, resulting in a balance of environmental and economic benefits.

Objectives:

Although we are continually improving our ability to monitor the coastal and Great Lakes environments, more research and model development is required to understand the complex relationship between climate change and variability and the coupled physical, chemical, and biological processes occurring within these environments. To accomplish this NCCOS will:

- Assess the impacts of climate change and variability and extreme events on coastal, estuarine, and Great Lakes living resources and ecosystems.

- Develop ecosystem models to predict the effects of climate change and variability on coastal, estuarine, and Great Lakes living resources and ecosystems.

- Develop water resource forecasting systems to predict the effects of climate change and variability on coastal ocean, estuarine, and Great Lakes systems.

- Develop and integrate coastal forecasting capabilities with real-time monitoring systems to improve the ability to predict physical processes required to support safe and efficient maritime services.

GOAL: *Understand and Predict the Effects of Oceanographic Changes on Coastal Ecosystems and Living Marine Resources*

The occurrence and abundance of marine organisms is determined by the characteristics of the waters in which they live. Factors such as food, temperature, water clarity, salinity, light, current speed and

direction, and bottom composition all affect population abundances and determine the occurrence of species. Therefore, a major issue is understanding how environmental factors affect living marine resource abundance and distribution, and the ecosystems upon which they depend. This knowledge, needed in the short (annual), long term (decadal) and meso and macro scales, allows the causes of change in population abundance and food web structure to be attributed to either natural events or human activities.

This goal supports NOS's goal to enhance the preservation and restoration of the U.S. coastal, ocean and Great Lakes environments.

Objectives:

The fundamental processes related to regime shifts, recruitment, and establishment of refugia and other management approaches requires a knowledge of how oceanic processes influence coastal ecosystems. To improve our understanding of these processes NCCOS will:

- Identify and describe key oceanographic features and processes that affect the condition of coastal, estuarine, and Great Lakes ecosystems.

- Determine causal linkages between indicators of change in meteorological and oceanographic conditions and measures of the state of coastal, estuarine, and Great Lakes living resources.

- Synthesize physical, chemical, and biological data for development of models that link biological production to physical forcing.

- Develop an understanding of the role of regime shifts on marine refugia.

Operational Goals and Objectives

As an integral component of NOS operations and services, NCCOS science should reflect NOAA's short and long term objectives of maintaining excellence, increasing relevance, improving efficiency, and reducing redundancies.

To ensure strong connections between science and stewardship missions and a constructive, balanced partnership with the academic community, NCCOS needs an appropriate portfolio that strategically allocates resources, informs internal and external audiences of its plans, and allows adequate and timely input for funding support. All these factors help integrate NCCOS into NOS and NOAA operations and service delivery. To accomplish this, NCCOS must maintain and improve its:

- scientific quality
- internal and external communications
- partnerships
- management and infrastructure.

While these operational goals cannot be readily measured, they can be promoted and improved upon through development of strategic plans and initiatives.

These goals support the NOS goal to promote the evolution of more inclusive, internal corporate culture that is results-driven, service oriented, science-based, responsive, and adaptive to change.

GOAL: *Develop and maintain the capability to conduct and apply high-quality research, monitoring, assessment, technical assistance, and technologies in support of coastal stewardship.*

Research, monitoring, and assessment lie along the continuum by which scientific understanding and information are developed and transferred to resource users, managers, regulators, and the scientific community. NCCOS provides National leadership in coastal ocean and Great Lakes science by offering a strong scientific foundation that is built upon a cadre of internal and external scientific and technical experts who improve our understanding of environmental change and offer coastal managers and other stakeholders technical assistance and advice on making scientifically credible decisions. Our activities lead to a wide array of products and services including reports, scientific publications, articles, databases, maps and charts, consulting expertise, management recommendations, expert witness testimony, geographic information system (GIS) applications, and Internet accessible information sources.

To ensure the quality and credibility of our science, we will:

Objectives:

- Expand and improve our system for scientific peer review and project selection.

- Maintain high professional standards for research and scientific advice by establishing guidelines for program and staff performance evaluations, performance award programs, and professional career development opportunities.

- Implement policies for ensuring the integrity and independence of science to ensure that our science programs, analyses, and products are sound, credible, and provide an objective basis for management.

- Improve our data collection and analysis techniques and systems.

- Improve our understanding of fundamental processes at work in the coastal ocean and Great Lakes to distinguish between natural variability and changes caused by human activities.

- Communicate scientific results in simplified terms that are easier for a broader audience to understand than traditional scientific publications.

- Develop products that not only contribute to the long-term knowledge base but help make sense out of diverse and sometimes contradictory data and observations.Solicit input from external scientists in topical areas when identifying research initiatives.

- Participate in international scientific initiatives.

GOAL: *Develop and maintain the capability to communicate information in a timely and consistent manner.*

Effective communication is essential for any organization to successfully achieve its stated goals and objectives. NCCOS has been charged with building a strong science component to provide leadership in coastal science within NOS. To successfully implement its programs and policies, NCCOS must effectively communicate information that is relevant, timely, and consistent. Establishment of NCCOS poses a communications challenge because of the diverse expertise and communication infrastructure found at its Centers. To ensure NCCOS information is communicated in a timely, consistent and usable manner we will:

Objectives:

- Establish, maintain, and evaluate periodically a communications strategy that is consistent with NOS' communications plan.

- Promote NOS' coastal stewardship responsibilities and NCCOS programs and activities.

- Provide constituents (e.g., Congress, states, other federal agencies, academia, NGOs, the public) with pertinent information about NCCOS programs and activities and take every opportunity to make public presentations of all program results.

- Provide efficient internal and external access to information on NCCOS programs and activities using a wide variety of communication methods.

- Work with the coastal stewardship community to improve our understanding of the scientific products and services needed to effectively manage coastal and Great Lakes systems.

GOAL: *Develop and maintain strong and productive partnerships.*

In times of limited resources, budgetary constraints, and increasing demands, no single organization is capable of addressing the entire coastal stewardship agenda. While NCCOS conducts and supports scientific investigations to preserve, protect, and develop the environmental health and sustainability of our coastal, estuarine, and Great Lakes resources, we do not do so alone. NCCOS must develop and maintain strong and productive partnerships with other components of NOS, other NOAA line offices, and with the external scientific community to leverage the resources necessary to accomplish the Nation's stewardship objectives. To accomplish this goal NCCOS will:

Objectives:

- Collaborate with other organizational components of NOS, NOAA line offices, and federal, state, and local agencies to advance the knowledge of all and help accomplish the mission of each.

- Establish cooperative working relationships with the academic community and non-governmental organizations with mutual interests to NCCOS, NOS, and NOAA.

- Increase the NCCOS and NOS presence in coastal communities by including public stakeholders in planning and decision-making.

GOAL: *Improve our management, infrastructure and workforce.*

The quality of NCCOS programs will only be as good as the talent we apply towards it. In a time where government agencies are continually streamlining their operations it will be a challenge for us to maintain our scientific and technical expertise. We recognize that our people are our greatest assets and we will strive to provide a working environment that offers the ability for professional development, fosters creative thinking and encourages some risk taking. To accomplish this we will:

Objectives:

- Improve internal communication within NCCOS through timely distribution of information, including notification and explanation of key decisions affecting employees.

- Improve results-based performance within NCCOS by assigning clear responsibility and accountability for the accomplishment of objectives.

- Ensure that our employees have access to computer and telecommunications capabilities and training commensurate with their job responsibilities and that adequate technical support services are provided for computer systems.
- Encourage training programs that support professional development.

- Improve our recognition of employee efforts through use of primary and alternative incentive reward systems.

- Delegate authority to the lowest appropriate level and foster employee input into the decision making process.